

Taxonomic Changes in American Metastelminae (Apocynaceae–Asclepiadoideae)

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ABSTRACT. One new species of *Cynanchum* from Ecuador is described, *C. schizocoronum* Liede & Meve, distinguished by its entirely fused corona with pronounced interstaminal folds and a strongly lacerate upper margin. One South American *Cynanchum* species is transferred to *Oxypetalum*, one to *Blepharodon*, two to *Jobinia*, two to *Metastelma*, two to *Petalostelma*, and one to *Tassadia*. One new synonym is recognized in *Ditassa* and one in *Tassadia*. The sectional affiliation of six species of *Cynanchum* is clarified.

Key words: Apocynaceae, Asclepiadoideae, *Blepharodon*, *Cynanchum*, *Ditassa*, Ecuador, *Jobinia*, *Metastelma*, Metastelminae, *Oxypetalum*, *Petalostelma*, South America, *Tassadia*.

In the Old World, the concept of *Cynanchum* L. (Asclepiadeae–Metastelminae) is rather clear-cut after the exclusion of *Vincetoxicum* Wolf (Liede, 1996a). In the New World, Woodson (1941), based on North American material, united morphologically highly diverse material with *Cynanchum*. Liede and Meve (1997) excluded some obvious misfits from the genus, and Liede (1997a) attempted to structure the speciose conglomerate on the sectional level. The two morphologically most distinct sections, *Mellichampia* (A. Gray ex S. Watson) Sundell and *Roulinia* (Decaisne) Sundell, had been revised earlier by Sundell (1981). In the course of a thorough revision of the American Metastelminae and treatments for various South and Central American flora projects, one new species was encountered and several species were found that better fit the concept of some smaller genera than of even a widely circumscribed *Cynanchum*. Instead of a single morphological character (an at least basally ring-shaped gynostegial corona), a wider range of vegetative and reproductive characters is used to assess generic affinity, an approach that has been confirmed in Old World Asclepiadeae by recent molecular research (Liede, unpublished data).

Terminology follows Liede and Weberling (1995) for inflorescences, with “sciadioidal” denoting an umbel-shaped inflorescence derived from a bostryx

by shortening of internodes. For details of corona structure, Liede and Kunze (1993) is followed, with Cs denoting staminal parts, Ci denoting interstaminal parts of a gynostegial corona, and C(is) indicating the fused portion of staminal and interstaminal parts. Details of anther structure and function are explained in Liede (1996b). Indumentum terminology is applied according to Hewson (1988).

NEW SPECIES

***Cynanchum schizocoronum* Liede & Meve, sp. nov.** TYPE: Ecuador. Chimborazo: thickets, 1200–1500 m, 20 Feb. 1955, *Asplund* 15474 (holotype, S). Figure 1.

Species bene distincta margine supere coronae lacerata et bifida.

Plants small climbers, twining, sparsely irregularly branched. Shoots perennial, herbaceous, sparsely covered along two lines with recurved trichomes, 300–400 µm long. Internodes 40–70 cm long, ca. 1 mm diam. Latex white. “*Stipules*” absent. *Leaves* with petiole 10–20 mm long, blades herbaceous, with 2–4 colleters at the base, discolorous, 30–60 × 15–25 mm, ovate, basally cordate, apically acute, marginally straight and not thickened, adaxially isolatedly and evenly covered with appressed trichomes, 150–200 µm long, abaxially glabrous. *Inflorescences* always one per node, extra-axillary, 4- to 6-flowered, all flowers open synchronously, sciadioidal. Peduncles 3–6 mm long, densely covered along a single line with recurved trichomes, 150–200 µm long. *Floral bracts* 0.8–1 × ca. 0.5 mm, ovate, with trichomes. Pedicels 4–7 mm long, densely covered along a single line with recurved trichomes, 150–200 µm long. *Mature floral buds* ca. 4 mm long, ca. 3.5 mm diam., ovoid to globose, with imbricate aestivation. *Calyx* basally fused, ciliate; lobes 1.3–1.5 × ca. 1 mm, ovate, apically acute. *Corolla* rotate, 4–6 mm long, cream to greenish yellow, glabrous; lobes basally fused, 2.2–2.5 mm wide, ovate, apically acute to acuminate, marginally smooth. *Gynostegial corona* of conate staminal and interstaminal parts (C(is)), white,

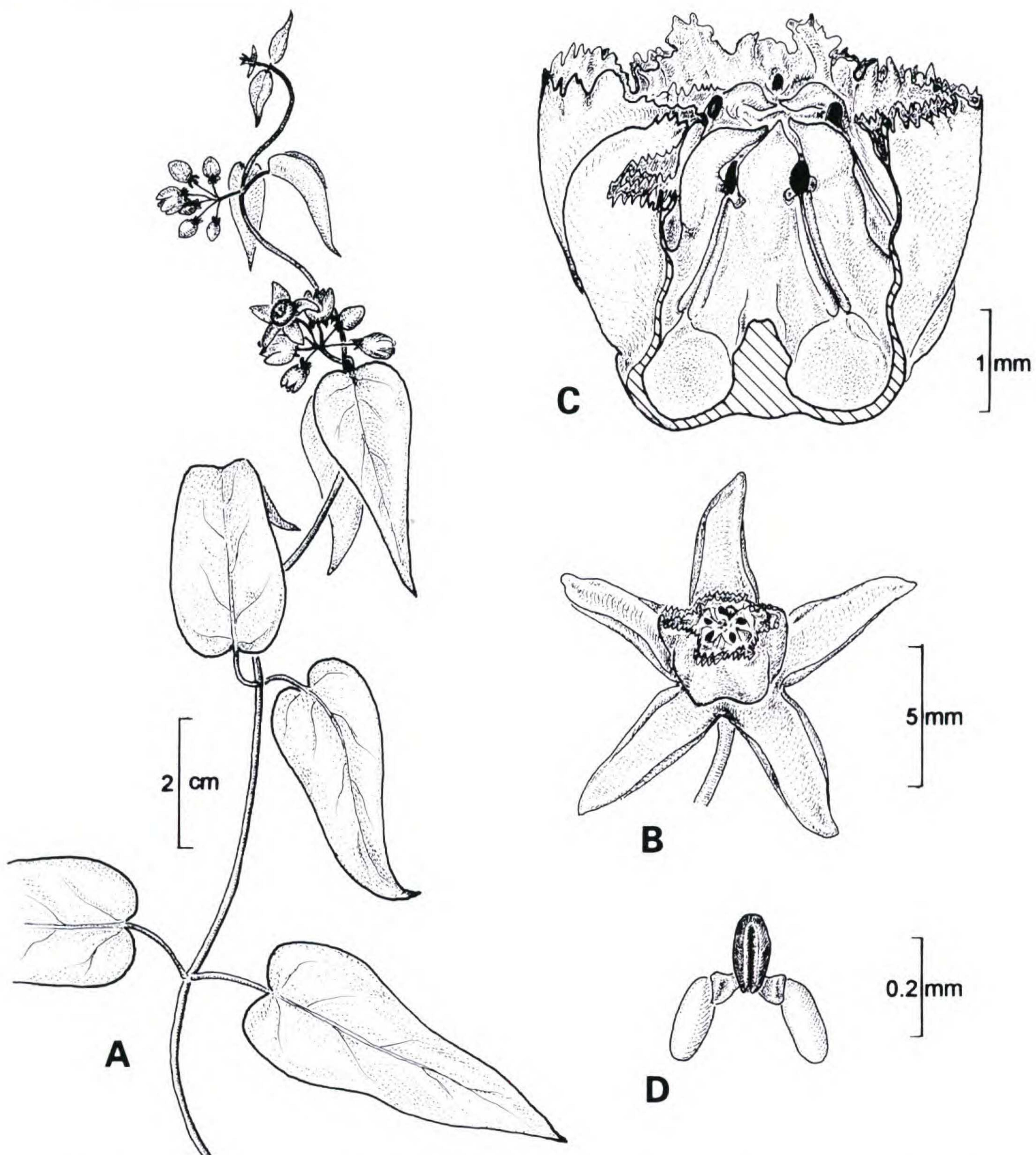


Figure 1. *Cynanchum schizocoronum* Liede & Meve. —A. Habit. —B. Flower. —C. Corona in lateral view with parts of the corona removed to show the gynostegium. —D. Pollinarium. (Drawn by U. Meve from the type, *Asplund 15474*.)

1.8–2.5 mm high, equaling the gynostegium in height, cyathiform; staminal parts (Cs) basally connate to the filament, appressed to the back of the stamens, laminar, apically erect, with straight, lacerate margins, split along the upper edges; interstaminal parts (Ci) laminar, producing a pronounced convex fold along the upper two thirds of corona length, sulcate, erect, with lacerate margins split along the upper edges. Gynostegium 2–2.5 × 1.8–2 mm, sessile. Stamens with filament ca. 0.5 mm high; anthers broader than high, hexagonal,

abaxially planar; anther wings 1.25 mm long, extending along the whole length of the anther, consisting of distal and proximal ridge, proximal ridge curved; anther wings of adjacent anthers parallel to each other, centrifugal, basally forming a distinct "mouth" with the basal lateral margin of the anther. Connective appendages 0.6 × 0.4 mm, obovate, narrower than the stamen, slightly to strongly inflexed. Pollinarium: Corpusculum 300–350 μm long, ovoid, margins of the corpuscular cleft parallel, basally widened. Caudicles 100–120 μm

long, (sub-)basally inserted at the corpusculum, flattened, straight, declinate, trapezoid to rectangular. Pollinia subapically attached to the caudicles, $0.35\text{--}0.4 \times 0.12$ mm, ovate in cross section, oblongoid. Stylar head white, $0.9\text{--}1 \times 0.5\text{--}0.6$ mm; part above the corpusculi 0.1 mm high, shorter than the lower part, flat. Fruit, seed, and chromosome number unknown.

Flowering time. February, May, July.

No other *Cynanchum* species is known in which the corona is split vertically in two parts along the upper edge. In the New World, the only species with a similar corona and gynostegium structure is *C. morrenioides* Goyder, but there the corona entirely conceals the gynostegium. In the Old World, a Madagascan group of species around *C. andringitrense* Choux displays a very similar corona structure with an entirely fused gynostegial corona, but pronounced folds of the interstaminal corona parts. Outside Madagascar, such a corona structure has not yet been found in the Old World.

Paratypes. ECUADOR. **Chimborazo:** Huigra, 1200 m, 19 July 1939, Asplund 7731 (S); cañon of the Río Chanchan, 1130–1500 m, 7 May 1945, Camp E-3035 (S).

NEW COMBINATIONS

ASCLEPIADEAE—OXYPETALINAE

The Oxypetalinae are an exclusively South American subtribe of 12 genera, characterized by a pronounced corolla tube and a conspicuously long stylar head (Liede, 1997b).

Oxypetalum rusbyi (Malme) Liede & Meve, comb. nov. Basionym: *Cynanchum rusbyi* Malme, Ark. Bot. 25(7): 9. 1932, new name for *Vincetoxicum umbellatum* Rusby, Mem. Torrey Bot. Club 6: 78. 1879. TYPE: Bolivia. Larecaja: Viciniis Sorata, Cochipata, Echurani, 2750–3000 m, Feb. 1860, Mandon 356 (holotype,?; isotype, S). Figure 2.

As the name *Oxypetalum umbellatum* Gardner (Hooker, Lond. J. 1: 179. 1842) is not available, the new combination has to be based on the nom. nov. of Malme (1932). Malme (1932) pointed out the similarity of this taxon with *O. streptanthum* (Malme) Liede, but placed both taxa in *Cynanchum* because they lack translator appendages. *Oxypetalum rusbyi* shares with *O. streptanthum* a twisted corolla and long stylar head (Fig. 2), and should therefore be regarded as a member of *Oxypetalum* subg. *Cryptodus* (E. Fournier) T. Meyer, in which translator appendages are absent. Both species possess a gynostegial corona of fused staminal and in-

terstaminal lobes; however, they differ in the staminal lobes exceeding the interstaminal lobes in *O. streptanthum*, whereas both reach the same length in *O. rusbyi*.

Additional material seen. PERU. **Cajamarcá:** Conumazá, Entrada de bosque Cachil, 2500 m, 13 Dec. 1993, Sagástegui, Tellez & Tirado 15124 (F).

ASCLEPIADEAE—METASTELMINAE

Blepharodon harlingii (Morillo) Liede & Meve, comb. nov. Basionym: *Cynanchum harlingii* Morillo, Ernstia 2: 62. 1992. TYPE: Ecuador. Zamora-Chinchipe: above Vallodolid, on road to Yangana, 2300 m, Feb. 1985, Harling & Andersson 21422 (holotype, GB).

The corona of *B. harlingii* consists of five completely separate staminal parts, so that the species does not even formally fit the circumscription of *Cynanchum*. The pronounced leaf venation, the long pedunculate inflorescence, and the three-dimensional shape of the corona lobes clearly identify this species as a member of *Blepharodon*, even though the long filament tube and short guide rails are not typical of this genus.

Illustration: Morillo (1992: 70, fig. 1).

Jobinia glossostelma (Lillo) Liede & Meve, comb. nov. Basionym: *Cynanchum glossostelma* Lillo, Physis 4: 423. 1919. TYPE: Argentina. Tucumán: Bajo de Anfama, 12 Dec. 1888, Lillo 1177 (holotype, LIL 30510; isotype, MO).

This species has also been included in *Cynanchum* only on account of its basally fused gynostegial corona. Its extra-axillary, but branched and very rich-flowered inflorescences, however, are indicative of a different affinity. The stipitate gynostegium and the extra-axillary inflorescences do not fit the present concept of *Orthosia*. A transfer to *Jobinia*, a diverse genus comprising species with both axillary and extra-axillary inflorescences, with basally and very highly fused gynostegial coronas, and with glabrous and densely pilose corolla lobes (Fontella Pereira & Schwarz, 1982; Schwarz & Fontella Pereira, 1985), seems the best solution at present.

Illustration: Meyer (1944: t. 65).

Additional material seen. ARGENTINA. **Catamarca:** El Rodeo, Jan. 1910, Castillon 1702 (SI). **Tucumán:** Chelicasta, Estancia Las Pavas, 2300 m, 12 Dec. 1926, Venturi 4602 (MO, S).




Figure 2. *Oxypetalum rusbyi* (Malme) Liede & Meve. —A. Habit, with one ripe fruit. —B. Flower. —C. Gynostegium, corona partially removed. —D. Corona. —E. Pollinarium. —F. Stylar head. —G. Seed. (A, C, E–G drawn by U. Frentsche; B, D drawn by J. Conrad from *Mandon* 356.)

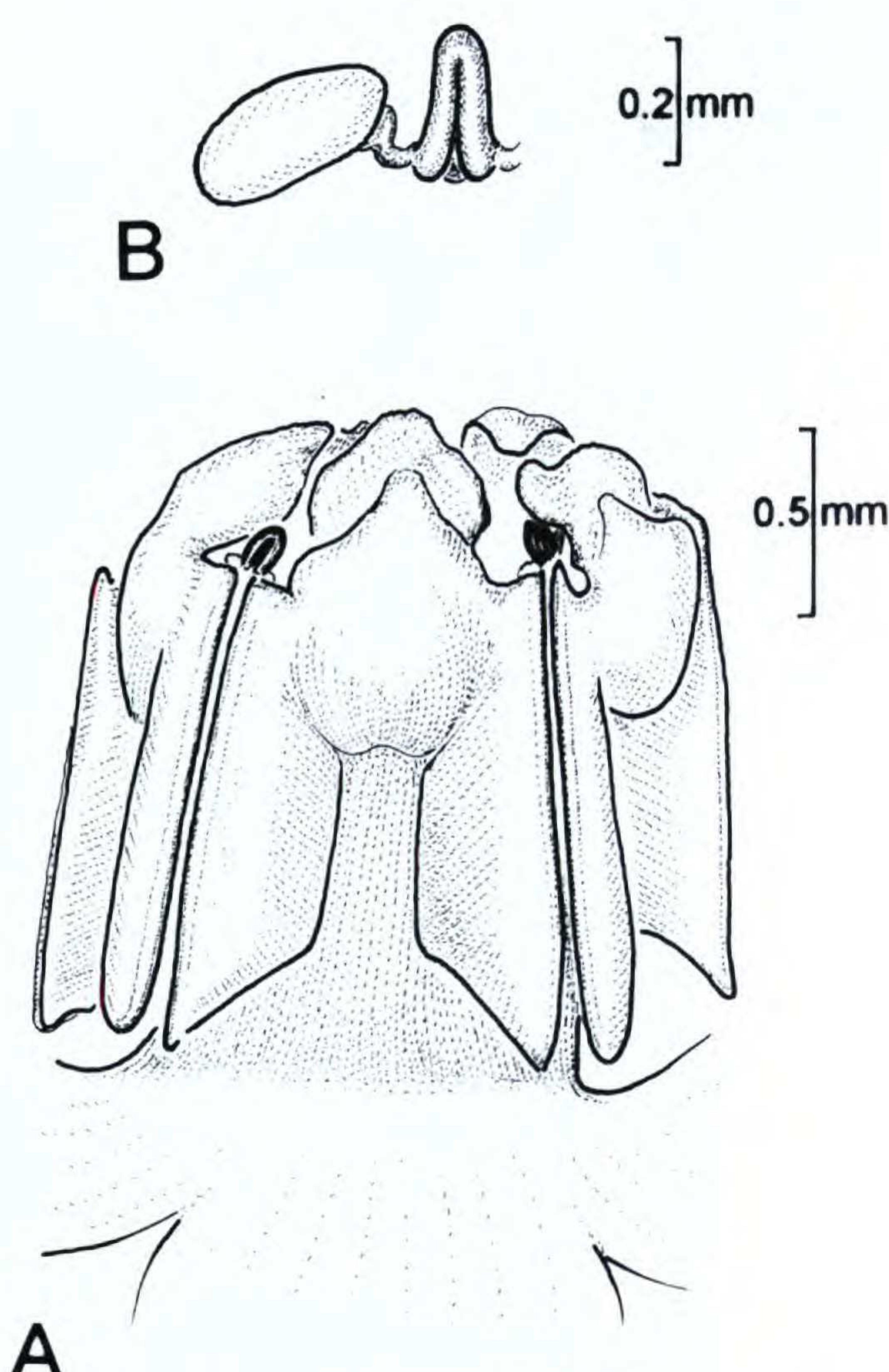


Figure 3. *Jobinia neei* (Morillo) Liede & Meve. —A. Gynostegium (note the basally spreading, almost free, membranous corona lobes). —B. Pollinarium. (Drawn by U. Meve from the type, Nee 30728.)

Jobinia neei (Morillo) Liede & Meve, comb. nov.
Basionym: *Cynanchum neei* Morillo, Ernstia 51: 5. 1989. TYPE: Venezuela. Territorio Federal Amazonas: Cerro de la Neblina, Camp VII, 1725 m, Feb. 1985, Nee 30728 (holotype, VEN; isotypes, NY, WIS). Figure 3.

This species, with its double, axillary, branched lax inflorescences, glabrous corolla lobes, and a spreading, basally fused corona (Fig. 3), is difficult to place. Axillary inflorescences are not found in *Cynanchum*, and a comparable corona is not known for any species. In the genera with axillary inflorescences, inflorescences are too lax and flowers and pollinaria too large (Fig. 3) for *Orthosia*. Neither corona structure nor the bowl-shaped, rather large flowers agree with the present concept of *Gonioanthela*. The closely related genus *Cyathostelma*, though never formally abolished, has ceased to exist with the transfer of *C. latipes* to *Orthosia* (Malme, 1928) and *C. furcatum* E. Fournier to *Jobinia* (Fontella Pereira, 1970). *Jobinia*, again, seems the best place for this aberrant species.

Illustration: Morillo (1989, fig. 12 (habit and flower)).

Metastelma dorrii (Morillo) Liede & Meve, comb. nov. Basionym: *Cynanchum dorrii* Morillo, Ernstia 2(1–2): 6. 1992. TYPE: Venezuela. Trujillo: Boconó, Páramo de Guaramacal, 2200 m, 28 Apr. 1988, Dorr, Barnett & Coello 4971 (holotype, VEN; isotype, MERF). Figure 4.

Neither the axillary inflorescences, nor the hairy corolla lobes, nor the corona consisting solely of free staminal lobes (Fig. 4) support this species as a member of *Cynanchum*. Liede (1997a) considered it a possible candidate for transfer to *Orthosia* because of its axillary inflorescences, but the hairy corolla lobes and the free corona indicate its affinities to *Metastelma*.

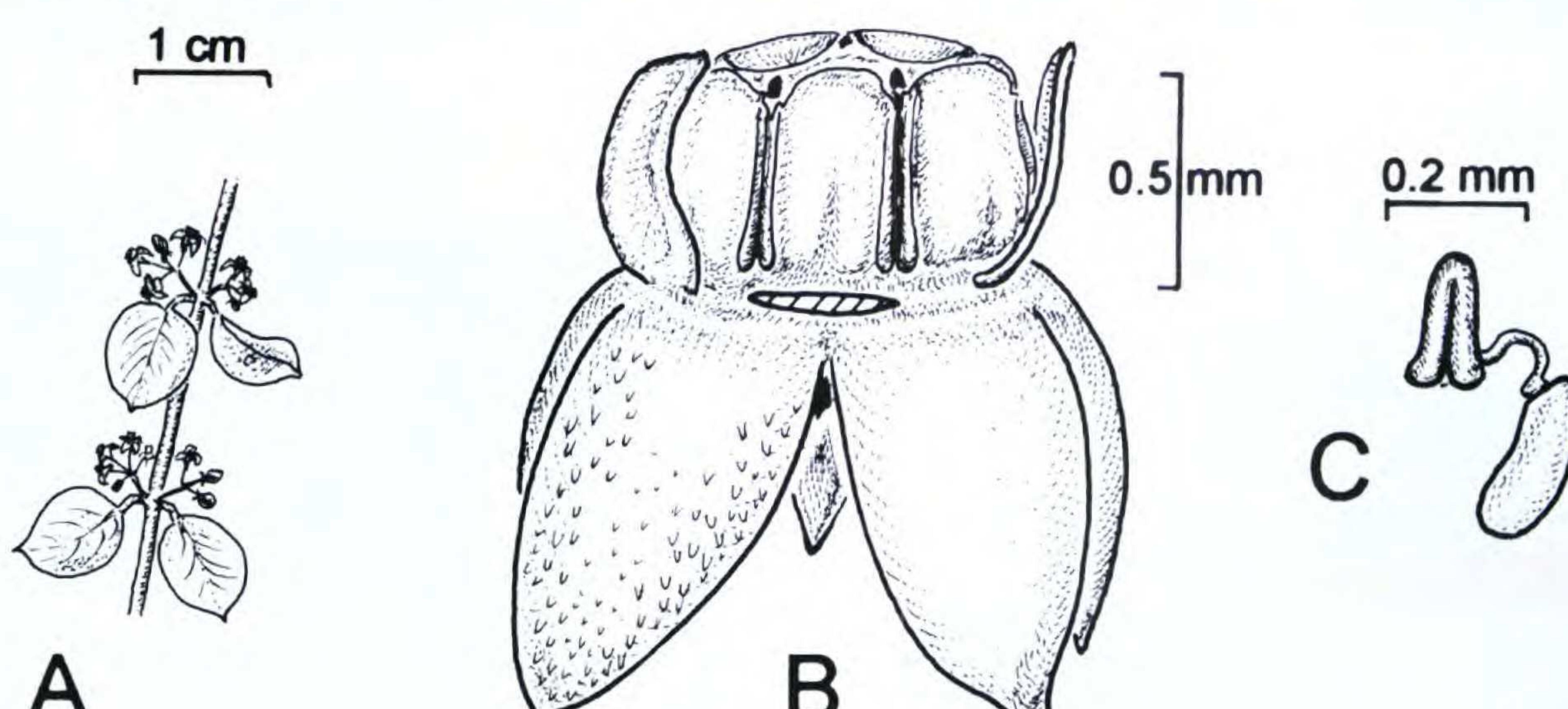


Figure 4. *Metastelma dorrii* (Morillo) Liede & Meve. —A. Habit. —B. Flower, one corona lobe removed. —C. Pollinarium. (Drawn by U. Meve from Dorr et al. 4971.)

Metastelma guanchezii (Morillo) Liede & Meve, comb. nov. Basionym: *Cynanchum guanchezii* Morillo, Ernstia 36: 5. 1986. TYPE: Venezuela. Amazonas: Río Negro, 15–20 km S de Tama-Tama, 90 m, Guanchez 2010 (holotype, TFA not seen; isotype, VEN).

The densely pilose corolla lobes and the corona of five distinct staminal lobes correspond to the generic characters of *Metastelma*, but not of *Cynanchum*.

Illustration: Morillo (1997: Fl. Ven. Guyana, Vol. 3).

Additional material seen. VENEZUELA. **Amazonas:** Cucurital de Yagua, ca. 120 m, 8 May 1979, Davidse, Huber & Tillett 17356 (MO); Canaripo, 98 m, May 1978, Huber 1926 (VEN), 125 m, Dec. 1976, Steyermark & Redmond 112839 (VEN); Sabana Manacal, Río Atabapo, 15 km above Guarinumo, 125 m, 12 June 1959, Wurdack & Adderley 42975 (VEN).

Petalostelma robertii (S. Moore) Liede & Meve, comb. nov. Basionym: *Vincetoxicum robertii* S. Moore, J. Bot. 42: 104. 1904. *Metastelma robertii* (S. Moore) Malme, Ark. Bot. 21A(12): 7. 1927. *Cynanchum robertii* (S. Moore) Malme, Ark. Bot., 26A(4): 28. 1934. TYPE: Brazil. Mato Grosso: Corumbá, 18 Dec. 1902, Robert 718 (holotype, BM). Figure 5.

Petalostelma robertii is unique in South American Metastelminae for the whorled appearance of the leaves, due to the very short side branches in every leaf axil (Fig. 5). The long slender single fruits and extremely slender pedicels exclude it from *Cynanchum*, the dense indumentum on the corolla lobes from *Orthosia*. All these characters fit well with *Petalostelma*.

Additional material seen. BRAZIL. **Mato Grosso:** Hoehne 3114 (S); Corumbá, 17 Dec. 1902, Malme 2708 (UPS), 2 Apr. 1903, Malme 3022 (S). PARAGUAY. Alto Chaco, 1906, Fiebrig 1480 (S).

Petalostelma sarcostemma (Lillo) Liede & Meve, comb. nov. Basionym: *Cynanchum sarcostemma* Lillo, Physis 4: 424. 1919. TYPE: Argentina. Salta: Rosario de la Frontera, 6 Jan. 1905, Lillo 3844 (lectotype, designated by Meyer (1944), LIL). Figure 6.

Venturi 1677 has been named as a type by Malme (1934), who did not, however, state explicitly that he chose this specimen as lectotype. Furthermore, the original description by Lillo stated Salta as the area in which the species was found, so that Meyer's (1944) lectotypification better represents the intention of the author.

Petalostelma sarcostemma is clearly misplaced in *Cynanchum*, however widely circumscribed. Its long, slender single fruits and extremely slender smooth seeds with pronounced wings are strikingly similar to those of the type of the genus, *P. martianum* E. Fournier (compare Fournier, 1885: pl. 98); further common characters include the tiny pollinaria with a lateral submedian attachment of the pollinia to the caudicles, and a very shortly pedunculate sciadioidal few-flowered inflorescence with delicate flowers (Fig. 6) that are also characteristic of the previous species, *P. robertii* (Fig. 5).

Compared to the species added to *Petalostelma* by Fontella Pereira (1994), *P. sarcostemma* shares with *P. cearensis* in addition to the above characters the rather long, regularly distributed trichomes on the corolla and the entirely free corona lobes. With *P. calcarata*, it shares the massive corona lobes.

Illustration: Meyer (1944: t. 71).

Additional material seen. ARGENTINA. **Salta:** Capital, Cerro de San Bernardo, ca. 1 km from beginning of rd., 1250 m, 22 Feb. 1993, Liede & Conrad 3101 (MO, ULM); La Candelaria; La Candelaria, right before river crossing, ca. 1000 m, 18 Feb. 1993, Liede & Conrad 3099 (ULM). **Tucumán:** San Pedro de Colalao, 1120 m, 17 Feb. 1993, Liede & Conrad 3090 (ULM); Trancas, Vipos, 900 m, 30 Jan. 1922, Venturi 1677 (SI).

Tassadia manarae (Morillo) Liede & Meve, comb. nov. Basionym: *Cynanchum manarae* Morillo, Brittonia 30: 47. 1978. TYPE: Venezuela. D.F. Parque Nacional El Avila, Quebrada Quintero, 1600 m, 25 Sep. 1976, Manara s.n. (holotype, VEN). Figure 7.

Corona morphology in *Tassadia* and *Cynanchum* is rather similar in at least basally fused staminal and interstaminal parts and does not allow for a clear distinction between these genera. *Tassadia* is separated from *Cynanchum* by its lax inflorescence structure (Liede & Weberling, 1995) and its slender double follicles. From both characters, *T. manarae* is clearly a member of *Tassadia*, and not of *Cynanchum*. It is unusual for *Tassadia* only by its pronounced stipe (Fig. 7); however, such stipes have been encountered in almost all genera of South American Metastelminae.

Additional material seen. VENEZUELA. **Distrito Federal:** Cerro El Avila, 1900–1950 m, 17 July 1992, W. Meier 2446 (UBT, VEN); 1970 m, 15 Aug. 1992, W. Meier 2626 (MERF). **Miranda:** Canal de Garate, 1920–1940 m, 19 Mar. 1993, W. Meier 3482 (MERF).

NEW SYNONYMS

Ditassa angustifolia Decaisne, in De Candolle, Prodr. 8: 575. 1844. *Cynanchum angustifol-*




Figure 5. *Petalostelma robertii* (S. Moore) Liede & Meve. —A. Habit. —B. Inflorescence. —C. Flower. —D. Section of corolla. —E. Corona and gynostegium, one corona lobe removed. —F. Pollinarium. —G. Stylar head. —H. Fruit. (Drawn by J. Conrad from Robert 718 except for H, which is from Fiebrig 1480.)

ium (Decaisne) Morillo, Ernstia 36: 3. 1986.
TYPE: Guyana. Roraima: Schomburgk 627
(holotype, P; isotype, BM). Figure 8.

Ditassa bolivarensis (R. W. Holm) Morillo, Novon 2: 32.
1992. Syn. nov. Basionym: *Cynanchum bolivarensis*
R. W. Holm, Fieldiana 28: 504. 1953. TYPE: Venezuela. Bolívar: Gran Sabana, at tributary to Río Kukenán, at base of Mt. Roraima, 1185–1280 m, 24

Sep. 1944, Steyermark 58555 (holotype, F; isotype,
NY).

Probably the synonymy of these two species had not been recognized earlier because of the poor state of Schomburgk's material. The leaves in particular seem much more narrow in *D. angustifolia* than in *D. bolivarensis*; however, this is clearly an

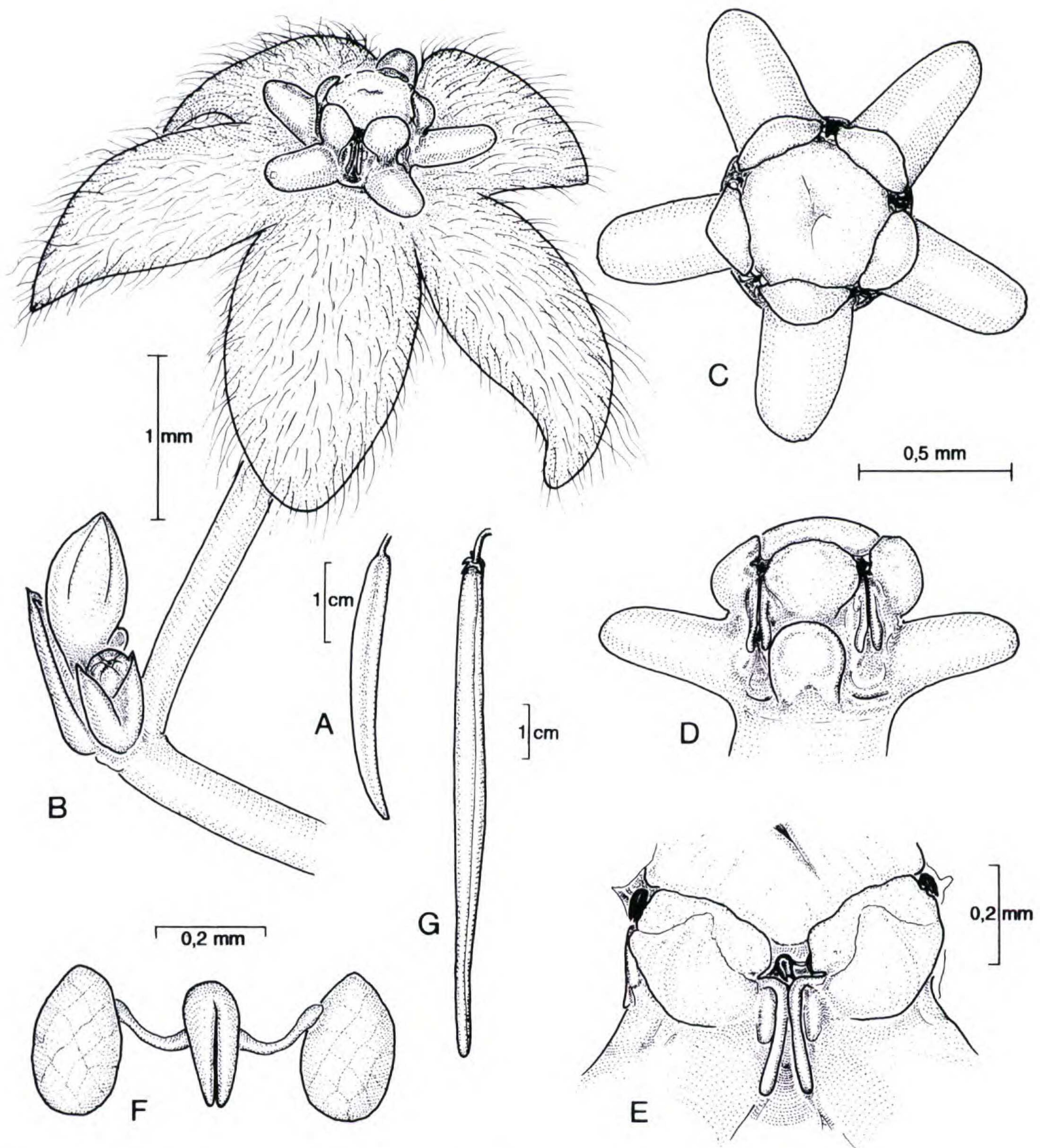


Figure 6. *Petalostelma sarcostemma* (Lillo) Liede & Meve. —A. Leaf. —B. Inflorescence with one flower open. —C. Corona and gynostegium in top view. —D. Corona and gynostegium in side view. —E. Anthers with guide rails. —F. Pollinarium. —G. Fruit. (Drawn by U. Meve from Liede & Conrad 3090.)

artifact of a poor drying technique. The flowers agree in all relevant characters such as size, indumentum of the adaxial side of the corolla, shape of inner and outer corona lobes, guide rails, and the peculiar mushroom-shaped stylar head (Fig. 8). In addition, the two type specimens originate from the same mountain range (Roraima), albeit from different sides, so that there is no doubt about their conspecificity.

Additional material seen. VENEZUELA. Bolívar: Gran Sabana, between Kun and Uaduara-parú, in valley

of Río Kukenán, S of Mt. Roraima, 1065–1220 m, 1 Oct. 1944, Steyermark 59106 (paratype, NY).

Tassadia kamaensis (Morillo) Morillo, Ernstia 51: 13. 1989. Basionym: *Cynanchum kamaense* Morillo, Ernstia 4: 8. 1981. TYPE: Venezuela. Bolívar: km 198 de la carretera El Dorado–Sta. Elena, base de Kamá-merú, 1200–1400 m, Dec. 1972, J. A. Steyermark, C. Steyermark, Wurdack & Wiehler 106624 (holotype, VEN). Figure 9A.

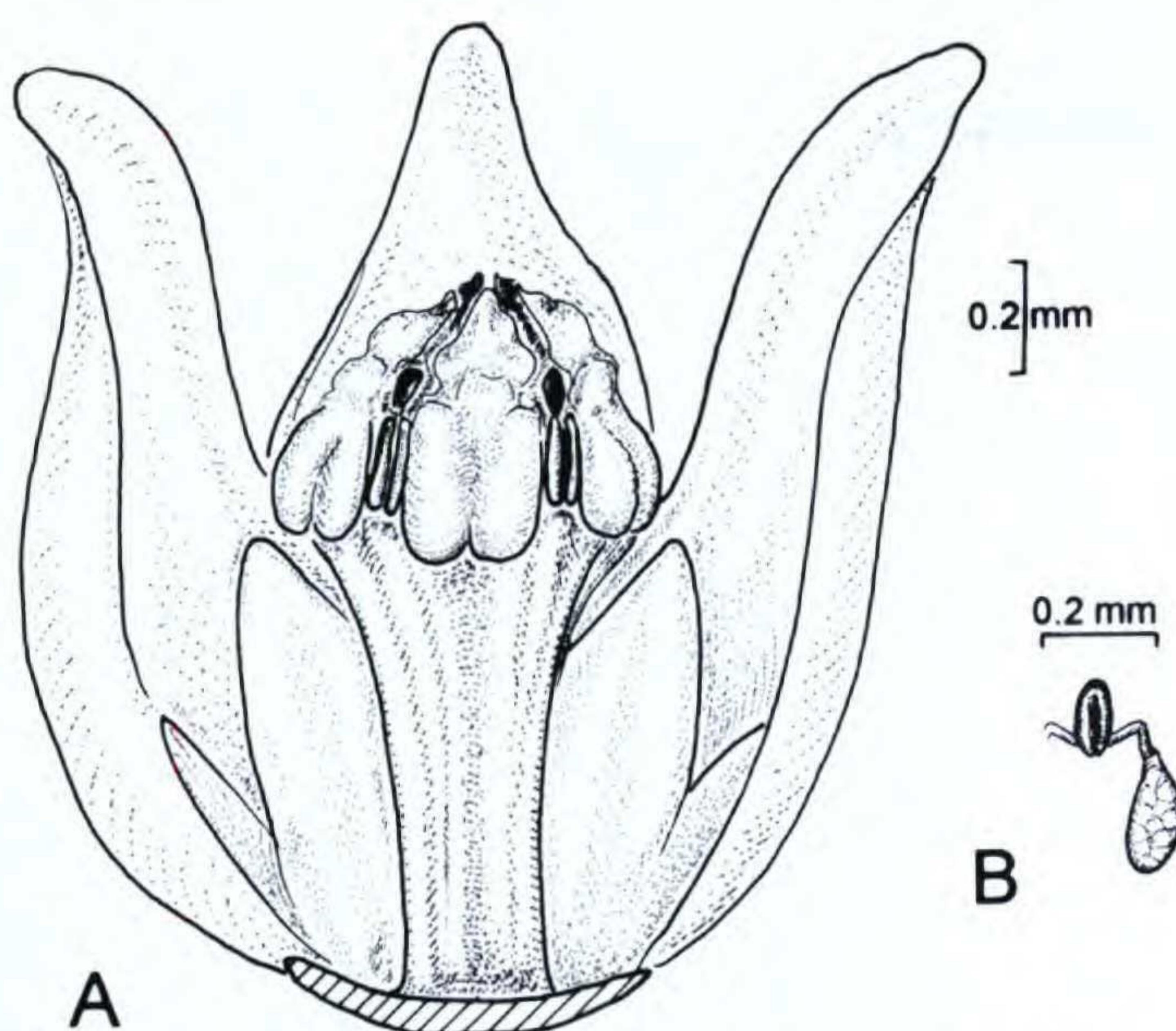


Figure 7. *Tassadia manarae* (Morillo) Liede & Meve. — A. Flower in lateral view with parts of the corolla and corona removed. —B. Pollinarium. (Drawn by U. Meve from the type, *Manara* s.n.)

Tassadia marahuacensis Morillo, Ernsta 51: 13. 1989.
Syn. nov. TYPE: Venezuela. Amazonas. Cerro Marahuaca, 1140 m, Feb.–Mar. 1985, Steyermark & Holst 130887 (holotype, VEN; isotype, MO). Figure 9B.

Tassadia marahuacensis represents a synonym of *T. kamaensis* because the two taxa agree totally not only in floral structure, but also in the characteristic long-attenuate leaf shape and almost sessile inflorescences, bostrychoid inflorescences lacking the elongation of the sympodial branch produced by the α -bract typical of most *Tassadia* species (Fig. 9; see Liede & Weberling, 1995).

CHANGES IN SECTIONAL AFFILIATION OF NEW WORLD *CYNANCHUM* SPECIES

Liede (1997a) has identified species groups in American *Cynanchum* at the sectional level and delimited the genus from related genera. In addition, all species known at that date have been tentatively assigned to a section. In the meantime, new information on some species has become available leading to reconsideration of sectional affinity of six species, all assigned to *Cynanchum* sect. *Microphyllum*.

Cynanchum* L. sect. *Microphyllum Liede, Novon 7: 176. 1997.

Cynanchum carmenaeiae Morillo, Ernsta 2(1–2): 4. 1992. TYPE: Venezuela. Mérida: Carretera Estanques–El Molino, 17 km S de Estanques, 1650 m, 17 Mar. 1992, Morillo, Eriksen & Ståhl 10800 (holotype, VEN; isotype, MERF).

Liede (1997a) considered this species as a likely candidate for a transfer to *Orthosia* because of its very regular branching pattern. However, the inflorescences are clearly extra-axillary, the corona is thin and fused for more than 3/4 of its length, and the gynostegium is highly stipitate, a character combination fitting much better with *Cynanchum* sect. *Microphyllum* than with *Orthosia*.

Cynanchum confusum R. W. Holm, Fieldiana 28: 505. 1953. TYPE: Venezuela. Mérida: “La Isla” above Tabay, 2285–2745 m, 18 May 1944, Steyermark 56586 (holotype, Chicago Natl. Hist. Mus.; isotype, NY).

Liede (1997a) had no material of *C. confusum* and could thus not determine the affinities of this species. As detailed in the protologue, this species displays a character mix precluding any definite placement. The pilose corolla lobes suggest an affinity to *Metastelma*, but no corona fused for almost 1/3 of its length has been encountered in *Metastelma* yet. If considered a *Cynanchum*, section *Microphyllum* clearly harbors the closest relatives, with *C. luteynii* Morillo even sharing adaxially pilose corolla lobes.

Cynanchum nubicola Morillo, Ernsta 2: 8. 1992.
Metastelma nubicola (Morillo) Liede, Novon 7: 43. 1997. TYPE: Venezuela. Trujillo: carretera Carrache–La Peña, 31.5 km E de Carache, 2000–2200 m, 28 Sep. 1988, Morillo 10543 (holotype, VEN; isotype, MERF).

The corona of *C. nubicola*, upon careful examination, is fused at the base. Together with the adaxially glabrous corolla lobes, there is no argument any more to maintain the transfer of this species to *Metastelma*. With its urceolate, highly fused corolla, its long stipe, and pronouncedly baggy anther sacks, it fits well in *Cynanchum* sect. *Microphyllum*.

Cynanchum rizterranii Morillo, Acta Bot. Venez. 16: 66. 1993. TYPE: Venezuela. Mérida: Rivas Dávila, Páramo Batallón, entre Portachuelo y Qda. La Mogral, 2850–2900 m, 7 May 1977, Ruiz-Terán & Usubillaga 13501 (holotype, MERF).

Cynanchum siderocalyx Morillo, Acta Bot. Venez. 16: 68. 1993. TYPE: Venezuela. Mérida: Miranda, entre Las Palmas y Las Gonzales, Páramo de Palmira, 3200–3300 m, 23 May 1975, Ruiz-Terán & Dugarte 12226 (holotype, MERF).




Figure 8. *Ditassa angustifolia* Decaisne. —A. Habit. —B. Flower. —C. Petal, adaxial view. —D. Corona with gynostegium. —E. Attachment of corona lobes. —F. Pollinarium. —G. Stylar head. (A–D, F from the type of *D. boliviensis*, Steyermark 59106, E, G from the type of *D. angustifolia*, Schomburgk 627; executed by U. Meve from pencil drawings by J. Conrad.)

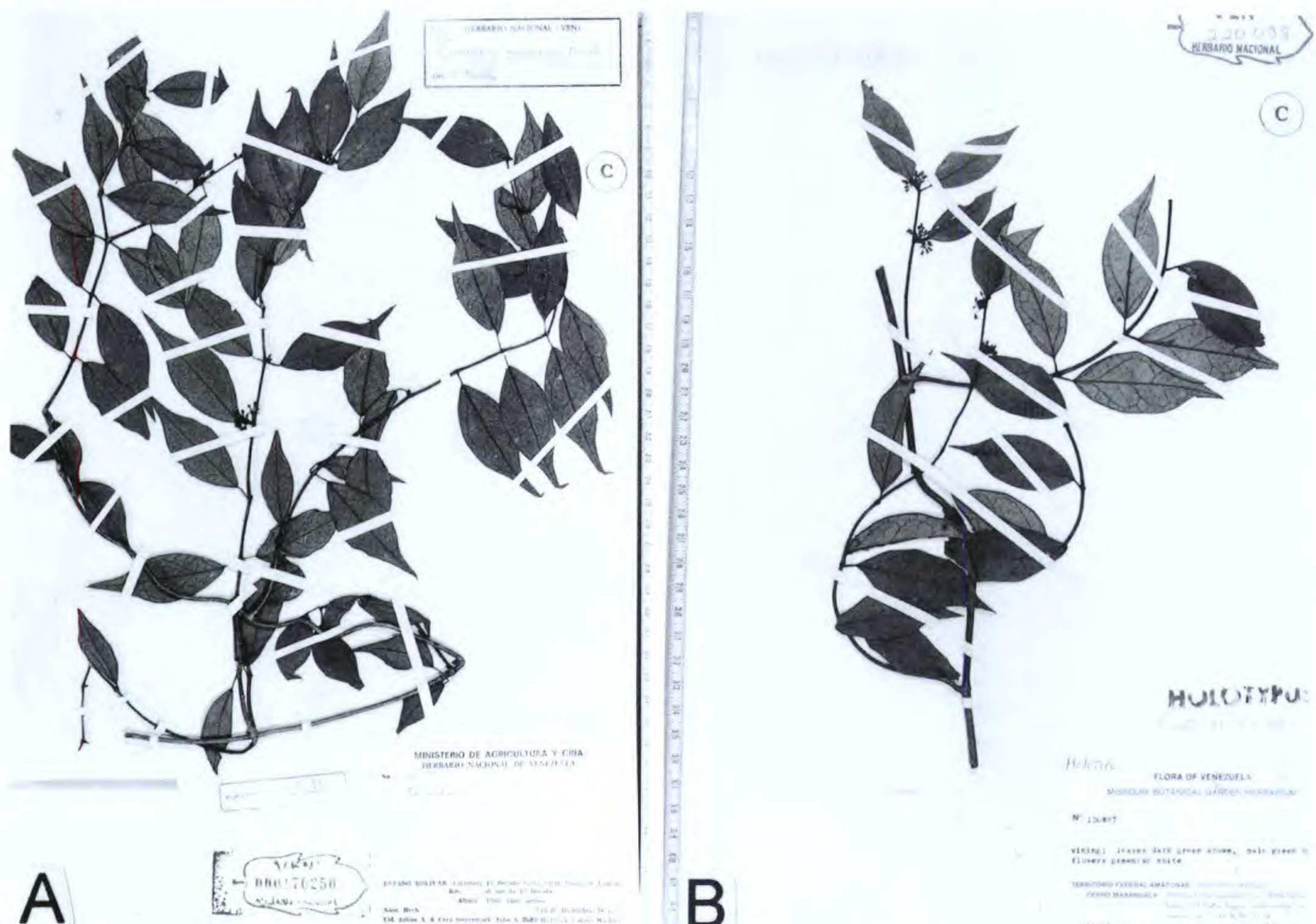


Figure 9. *Tassadia kamaensis* (Morillo) Morillo. —A. Holotype of *T. kamaensis*, Steyermark et al. 106624.—B. Holotype of *T. marahuacensis* Morillo, Steyermark & Holst 130887.

Both *Cynanchum ruiterranii* and *C. siderocalyx* had been unknown to Liede (1997a). The two species are extremely similar, and more material might prove them conspecific. The small leaves, rich-flowered, sciadioidal inflorescences, glabrous corolla lobes, basally fused gynostegial corona, and highly stipitate gynostegium leave no doubt as to their sectional affiliation in *Cynanchum* sect. *Microphyllum*.

Cynanchum violator R. W. Holm, Fieldiana 28: 509. 1953. TYPE: Venezuela. Táchira: between Betania and Tamá, 2430 m, 13 July 1944, Steyermark 57190 (holotype, Chicago Natl. Hist. Mus.; isotype, NY).

Cynanchum violator, like *C. confusum*, is one of those species combining several characters commonly used for sectional or even generic delimitation. Its reddish, glabrous corolla, and the equally reddish, very short, fleshy and almost annular corona are distinctly reminiscent of *Orthosia*. However, the long-pedunculate, lax and branched inflorescences, and the single, fusiform fruits suggest that it is a member of *Cynanchum* sect. *Microphyllum*.

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Literature Cited

- Fontella Pereira, J. 1970. Contribuição ao estudo das Asclepiadaceae brasileiras, VI. Novas combinações e novos sinônimos. Loefgrenia 43: 1–3.
- . 1994. Estudos em Asclepiadaceae, XXIX. Espécies novas da caatinga e novas combinações em *Petalostelma*. Pabstia 5: 4–6.
- . & E. A. Schwarz. 1982. Estudos em Asclepiadaceae 25. Chave para as espécies do gênero *Jobinia* Fournier ocorrentes no Brasil. Bol. Mus. Mun. (Curitiba) 51: 1–18.
- Fournier, E. 1885. Asclepiadaceae. Pp. 192–298 in C. F. P. v. Martius (editor), Flora Brasiliensis Vol. 6, 4. [Cramer, Lehre, Reprint, 1967.]
- Hewson, H. J. 1988. Plant Indumentum—A Handbook of Terminology. Australian Flora and Fauna Series 2: 1–27.
- Liede, S. 1996a. *Cynanchum–Rhodostegiella–Vincetoxicum–Tylophora*: New considerations on an old problem. Taxon 45: 193–211.
- . 1996b. Anther differentiation in the Asclepi-

- daceae: Form and function. Pp. 221–235 in W. G. D'Arcy & R. C. Keating (editors), *The Anther: Form, Function and Phylogeny*. Cambridge Univ. Press, Cambridge.
- . 1997a. American *Cynanchum* (Asclepiadaceae)—A preliminary infrageneric classification. *Novon* 7: 172–181.
- . 1997b. Subtribes and genera of the tribe Asclepiadeae (Apocynaceae–Asclepiadoideae)—A synopsis. *Taxon* 46: 233–247.
- & H. Kunze. 1993. A descriptive system for corona analysis in Asclepiadaceae and Periplocaceae. *Pl. Syst. Evol.* 185: 275–284.
- & U. Meve. 1997. Some clarifications, new species and new combinations in American *Cynanchum*. *Novon* 7: 38–45.
- & F. Weberling. 1995. Inflorescence structure in Asclepiadaceae. *Pl. Syst. Evol.* 197: 99–109.
- Malme, G. O. A. N. 1928. Über paarige extraaxilläre Infloreszenzen bei den Asklepiadazeen. *Svensk Bot. Tidskr.* 22: 49–56.
- . 1932. Asclepiadaceae austroamericanæ præcipue andinæ. *Ark. Bot.* 25A(7): 1–26, tab. 1–3.
- . 1934. Asclepiadaceæ argentinæ. *Ark. Bot.* 26A(4): 1–45.
- Meyer, T. 1944. Asclepiadaceæ. Pp. 1–273 in H. R. Descole (editor), *Genera et Species Plantarum Argentinorum* 2. G. Kraft, Buenos Aires.
- Morillo, G. 1989. Contribución al conocimiento de las Asclepiadaceæ suramericanas, principalmente de las Guyanas. *Ernstia* 51: 1–16.
- . 1992. New species and new combinations in the Andean *Cynanchum* and *Matelea* (Asclepiadaceæ). *Ernstia* 2: 59–72.
- . 1997. Asclepiadææ. Pp. 129–177 in J. A. Steyermark, P. E. Berry & B. K. Holst (editors), *Flora of the Venezuelan Guyana*, Vol. 3. Missouri Botanical Garden Press, St. Louis.
- Schwarz, E. A. & J. Fontella Pereira. 1995. O gênero *Jobinia* Fournier (Asclepiadaceæ) no Brasil. *Acta Biol. Par.* 24: 49–157.
- Sundell, E. 1981. The New World species of *Cynanchum* subgenus *Mellichampia* (Asclepiadaceæ). *Evol. Monogr.* 5: 1–62.
- Woodson, R. E. 1941. The North American Asclepiadaceæ. *Ann. Missouri Bot. Gard.* 28: 193–244.